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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HISAO HAYASHI, MASAHIRO FUJINO, YASUSHI SHIMOGAICHI, and MAKOTO TAKATOKU

Appeal 2009-003171
Application 09/772,986
Technology Center 2800

Decided: April 27, 2010

Before JOSEPH F. RUGGIERO, LANCE LEONARD BARRY, and HOWARD B. BLANKENSHIP, *Administrative Patent Judges*.

RUGGIERO, *Administrative Patent Judge*.

ON REQUEST FOR REHEARING

Appellants request that we reconsider our Decision of September 23, 2009 wherein we sustained the Examiner's 35 U.S.C. § 103(a) rejection of claims 17-27 and 36 based on Hisao, the 35 U.S.C. § 103(a) rejection of claims 28-32 based on the combination of Hisao and Colgan, and the

35 U.S.C. § 103(a) rejection of claims 31-35 based on the combination of Hisao and Seiki.

We have reconsidered our Decision of September 23, 2009 in light of Appellants' arguments in the Request for Rehearing, and we find no error therein. We, therefore, decline to make any changes in the prior Decision for the reasons which follow.

The following discussion addresses Appellants' three points of contention in the Request for Rehearing in support of the position that the Board Decision erred by relying on assertions that are unsupported within the Hisao reference or by any other supporting evidence:

I. There is no disclosure of intent in Hisao to optimize the relationship between the gate insulating film 4 and the gate electrode 5 whereby the thickness of the gate insulating film 4 is made to become greater than the thickness of the gate electrode 5.

To whatever extent Appellants (Request 6-7) may be correct that there is no indication from the disclosure of Hisao that there was any contemplation of a desired relationship between the thicknesses of the insulating film 4 and the gate electrode 5, it is not necessary that the rationale for modifying a reference's teaching come from the reference itself. "[T]he [obviousness] analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir.

2006). The *KSR* Court further recognized that "[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp." *KSR*, 550 U.S. at 421.

With the above discussion in mind, we remain unconvinced of any error in the Examiner's articulated line of reasoning which concluded that an ordinarily skilled artisan would have a desire to reduce the size of the thin film semiconductor to its smallest possible dimensions. The desire and necessity of producing high-density thin film semiconductor designs is, in fact, recognized at paragraph [0002] of Hisao. In doing so, it would follow that Hisao's smallest possible disclosed values for the gate insulating film 4 of 100 nm and "about 100 nm" (allowing for values slightly below 100 nm, *See In re Woodruff*, 919 F. 2d 1575, 1577 (Fed. Cir. 1990) for the gate electrode would be selected.[1] The end result of such a selection would be a thin film semiconductor device in which the thickness of the gate insulating film is greater than the thickness of the gate electrode as claimed.

Further, it is not necessary that Hisao appreciated the significance of the relationship of the thicknesses of the gate insulating film and the gate electrode if the end result of the obvious size reduction resulted in the claimed invention. It is not necessary that the prior art suggest the modification to achieve the same advantage or result discovered by

[1] Our original Decision found that the Examiner did not err in determining that Hisao's smallest disclosed thickness values (¶ [0012], of "around 50 nm" for the top layer 5a of the gate electrode and "50 nm" for the bottom layer 5b of the gate electrode would result in a combined gate electrode thickness of "about 100 nm."

Appellants. The rationale for modifying reference teachings is not limited to the problem the patentee was trying to solve: "'any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.'" *In re ICON Health and Fitness, Inc.*, 496 F.3d 1374, 1380 (Fed. Cir. 2007) (quoting *KSR*, 550 U.S. at 420).

We are also unpersuaded by Appellants' arguments (Request 8-15) that our original Decision erred by improperly relying on the Figure 1 drawing of Hisao in supporting the Examiner's conclusion of obviousness. It is important to note that neither the Examiner's stated position nor our original Decision relied solely on the drawing figures of Hisao in support of the determination that the previously discussed obvious size reduction consideration would result in a thin film semiconductor device with a gate insulating film thickness greater than the gate electrode thickness.

Contrary to Appellants' contention (Request 12-15) that there is no written description within Hisao of the thickness of the gate insulating film being greater than the gate electrode thickness, Hisao, as previously discussed, discloses (¶¶ [0012] and [0016]) the lower limit thickness values of 100 nm for the gate insulating film and "about 100 nm," allowing for values slightly below 100 nm for the gate electrode. With this disclosure, it is not necessary, nor was there any intent to do so, to rely solely on Hisao's drawing figures to support the Examiner's conclusion of obviousness. Nonetheless, Hisao's drawing figures stand as further evidence that an ordinarily skilled artisan, seeking to make the device of Hisao as small as possible, would select the smallest disclosed gate insulating film thickness and the smallest disclosed gate electrode thickness, resulting in a device in

which the thickness of the insulating gate film 4 is greater than the thickness of the gate electrode 5 as illustrated in Figure 1. *See In re Aslanian,* 590 F.2d 911, 914 (CCPA 1979). Further, although Appellants contend (Request 13) that a skilled artisan could, from the thickness value ranges disclosed by Hisao, reasonably select disclosed values where the thickness of the gate insulating film would be *less than* the gate electrode thickness, there would be no reasonable basis for doing so if the intent was to make the device of Hisao as small as possible.

II. The lack of recognition of the optimizing of the relationship between the thickness of the insulating film 4 and the thickness of the gate electrode 5 in Hisao stands as an exception to the "optimization" rule of In re Aller.

Appellants contend that our original Decision erred in relying upon *In re Aller*, 220 F.2d 454, 456 (CCPA 1955) as support for the Examiner's determination of obviousness of the claimed invention. According to Appellants (Request 16-18), an exception to the rule of *In re Aller* that it is not inventive to discover optimum or workable ranges by routine experimentation exists where, as in the present factual situation, there is no recognition that the parameters to be optimized would affect the result. As previously argued by Appellants, Hisao has no recognition of the relationship between the thickness of the gate insulating film 4 and the gate electrode 5.

In support of their position, Appellants direct attention to a prior decision of the Board in *Ex parte Whalen,* 89 USPQ2d 1078, 1083-1084 (BPAI 2008), in which the Board concluded that there was no recognition in

the cited art, which taught that low viscosity is a desirable characteristic of a composition, that increasing viscosity of a composition is a parameter that would effect the result through optimization. We do not find the facts of the *Whalen* decision to be applicable to the facts in the present case. As we previously pointed out, Hisao's disclosure ([0002]) recognizes the desire and necessity of producing high-density thin film semiconductor designs for use in video components. We fail to see how an ordinarily skilled artisan would not have recognized and appreciated that the thickness values of component elements of the thin film semiconductor device of Hisao, such as the gate insulating film 4 and the gate electrode 5, would be parameters that would effect the desired goal of reducing the size of the semiconductor device to its smallest possible values. In other words, as discussed *supra,* in "optimizing" the size reduction of the device of Hisao, the ordinarily skilled artisan would be obviously led to select the smallest possible disclosed thicknesses for the gate insulting film and the gate electrode.

III. Appellants' showing of unexpectedly good results by making the thickness of the gate insulating film greater than the thickness of the gate electrode stands as a further exception to the "optimization" rule of In re Aller.

Appellants argue (Request 21-29) that our original Decision erred in overlooking the evidence of unexpected results and comparative data establishing the criticality of the claimed range of thickness values in which the gate insulating film thickness is greater than the gate electrode thickness. We find no error in our original Decision, however, in which we agreed with the Examiner's conclusion that the evidence presented in the graphs of

Figures 3 and 4 shows no unexpected results for the disclosed gate electrode thickness values of 100 nm or below. Further, while Appellants contend (Request 26-27) that comparative data for gate electrodes of different thicknesses in Figures 3 and 4 has been presented, it is noteworthy that no data has been presented comparing thickness values for gate insulating film thicknesses being equal or smaller than the gate electrode thickness as compared to the claimed gate insulating film thickness being greater than the gate electrode thickness.

CONCLUSION

Based on the foregoing, we have granted Appellants' request to the extent that we have reconsidered our original Decision of February 27, 2009, but we deny the request with respect to making any changes therein.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

REHEARING DENIED

gvw

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